PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN WELDING SOCIETY, INC. (AWS)

AWS D1.2 (1997) Structural Welding Code Aluminum

SHEET METAL & AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC. (SMACNA)

SMACNA ASMM (1993) Architectural Sheet Metal Manual

1.2 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

1.2.1 SD- 02, Shop Drawings

Indicate thicknesses, dimensions, fastenings and anchoring methods, expansion joints, and other provisions necessary for thermal expansion and contraction. Scaled manufacturer's catalog data may be submitted for factory fabricated items.

1.3 DELIVERY, HANDLING, AND STORAGE

Package and protect materials during shipment. Uncrate and inspect materials for damage, dampness, and wet- storage stains upon delivery to the job site. Remove from the site and replace damaged materials that cannot be restored to like- new condition. Handle sheet metal items to avoid damage to surfaces, edges, and ends. Store materials in dry, weather- tight, ventilated areas until immediately before installation.

PART 2 - PRODUCTS

2.1 MATERIALS

Furnish sheet metal items in 8 to 10 foot lengths. Single pieces less than 8 feet long may be used to connect to factory- fabricated inside and outside corners, and at ends of runs. Factory fabricate corner pieces with minimum 36 inch legs. Provide accessories and other items essential to complete the sheet metal installation. These accessories shall be made of the same materials as the items to which they are applied. Fabricate sheet metal items of the materials specified below and to the gage, thickness, or weight shown in Table I at the end of this section. Sheet metal items shall have mill finish unless specified otherwise. Where more than one material is listed for a particular item in Table I, each is acceptable and may be used except as follows:

2.1.1 Exposed Sheet Metal Items

Shall be of the same material. The following items shall be considered as exposed sheet metal: fascias; cap, valley, base, and eave flashings and related accessories.

2.1.2 Drainage

In addition to the metals listed in Table I, lead- coated copper may be used for an exposed item if drainage from that item will pass over exposed masonry, stonework or other metal surfaces.

2.1.3 Steel Sheet, Zinc- Coated (Galvanized)

ASTM A 653/ A 653M.

2.1.3.1 Finish

Exposed exterior items of zinc-coated steel sheet shall have a baked-on, factory-applied color coating of polyvinylidene fluoride or other equivalent fluorocarbon coating applied after metal substrates have been cleaned and pretreated. Finish coating dry- film thickness shall be 8 to 1.3 mils and color shall match adjacent materials.

2.1.4 Zinc Sheet and Strip

ASTM B 69, Type I, a minimum of 0.61 mm 0.024 inch thick.

2.1.4.1 Finish

Exposed exterior galvanized sheet metal items or aluminum shall have a baked-on, factory-applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating applied after metal substrates have been cleaned and pretreated. Finish coating dry- film thickness shall be 0.8 to 1.3 mils, and color shall match adjacent materials.

2.1.5 Solder

ASTM B 32.

2.1.6 Bituminous Plastic Cement

ASTM D 4586, Type I.

2.1.7 Building Paper

Uncreped, reinforced, 20 lb. per inch dry tensile strength, 16 hour minimum water resistance.

2.1.8 Asphalt Primer

ASTM D 41.

2.1.9 Through- Wall Flashing

Through- wall flashing for masonry is specified in Section 04200, "Unit Masonry."

2.1.10 Fasteners

Use the same metal or a metal compatible with the item fastened. Use stainless steel fasteners to fasten dissimilar materials.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Requirements

Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections which might affect the application. For installation of items not shown in detail or not covered by specifications conform to the applicable requirements of SMACNA ASMM, Architectural Sheet Metal Manual. Provide sheet metal flashing in the angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight. Join sheet metal items together as shown in Table II.

3.1.2 Workmanship

Make lines, arrises, and angles sharp and true. Free exposed surfaces from visible wave, warp, and buckle, and tool marks. Fold back exposed edges neatly to form a 1/ 2 inch hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

3.1.3 Nailing

Confine nailing of sheet metal generally to sheet metal having a maximum width of 18 inches. Confine nailing of flashing to one edge only. Space nails evenly not over 3 inches on centers and approximately 1/ 2 inch from edge unless otherwise specified or indicated. Face nailing will not be permitted. Where sheet metal is applied to other than wood surfaces, include in shop drawings, the locations for sleepers and nailing strips required to secure the work. Sleepers and nailing strips are specified in Section 06100, "Rough Carpentry."

3.1.4 Cleats

Provide cleats for sheet metal 18 inches and over in width. Space cleats evenly not over 12 inches on centers unless otherwise specified or indicated. Unless otherwise specified, cleats shall be not less than 2 inches wide by 3 inches long and of the same material and thickness as the sheet metal being installed. Secure one end of the cleat with two nails and the cleat folded back over the nailheads. Lock the other end into the seam. Pretin cleats for soldered seams.

3.1.5 Bolts, Rivets, and Screws

Install bolts, rivets, and screws where indicated or required. Provide compatible washers where required to protect surface of sheet metal and to provide a watertight connection.

3.1.6 Seams

Straight and uniform in width and height with no solder showing on the face.

3.1.6.1 Flat lock Seams

Finish not less than 3/ 4 inch wide.

3.1.6.2 Lap Seams

Finish soldered seams not less than one inch wide. Overlap seams not soldered, not less than 3 inches.

3.1.6.3 Loose Lock Expansion Seams

Not less than 3 inches wide; provide minimum one inch movement within the joint. Completely fill the joints with the specified sealant, applied at not less than 1/ 8 inch thick bed. Sealants are specified in Section 07920, "Joint Sealants."

3.1.6.4 Standing Seams

Not less than one inch high, double locked without solder.

3.1.6.5 Flat Seams

Make seams in the direction of the flow.

3.1.7 Soldering

Where soldering is specified, it shall apply to copper, zinc- coated steel items.

3.1.7.1 Edges

Pretin edges of sheet metals before soldering. Slowly solder with well heated soldering irons so as to thoroughly heat the seams and completely sweat the solder through the full width of the seam. Scrape or wire- brush the edges of lead- coated material to be soldered to produce a bright surface. Flux brush the seams in before soldering. Treat with soldering acid flux the edges of stainless steel to be pretinned. Solder immediately after application of the flux. Upon completion of soldering, the acid flux residue shall be thoroughly cleaned from the sheet metal with a solution of washing soda in water and rinsed with clean water. Seal the joints in aluminum sheets of one mm 0.040 inch or less in thickness with specified sealants. Do not solder aluminum.

3.1.8 Welding and Mechanical Fastening

Use welding for aluminum of thickness greater than 0.040 inch. Aluminum 0.040 inch or less in thickness shall be butted and the space backed with formed flashing plate; or lock joined, mechanically fastened, and filled with sealant as recommended by the aluminum manufacturer.

3.1.8.1 Welding of Aluminum

Use welding of the inert gas, shield-arc type. For procedures, appearance and quality of welds, and the methods used in correcting welding work, conform to AWS D1.2.

3.1.8.2 Mechanical Fastening of Aluminum

Use No. 12, aluminum alloy, sheet metal screws or other suitable aluminum alloy or stainless steel fasteners. Drive fasteners in holes made with a No. 26 drill in securing side laps, end laps, and flashings. Space fasteners 12 inches maximum on centers. Where end lap fasteners are required to improve closure, locate the end lap fasteners not more than 2 inches from the end of the overlapping sheet.

3.1.8.3 Metal Surfaces

Paint surfaces in contact with mortar, concrete, or other masonry materials with alkali- resistant coatings such as heavy- bodied bituminous paint.

3.1.8.4 Wood or Other Absorptive Materials

Paint surfaces that may become repeatedly wet and in contact with metal with two coats of aluminum paint or a coat of heavy- bodied bituminous paint.

3.1.9 Protection from Contact with Dissimilar Materials

3.1.9.1 Aluminum

Aluminum surfaces shall not directly contact other metals except stainless steel, zinc, or zinc coating. Where aluminum contacts another metal, paint the dissimilar metal with a primer fllowed by two coats of aluminum paint. Where drainage from a dissimilar metal passes over aluminum, paint the dissimilar metal with a non-lead pigmented paint.

3.1.10 Expansion and Contraction

Provide expansion and contraction joints at not more than 32 foot intervals for aluminum and at not more than 40 foot intervals for other metals. Where the distance between the last expansion joint and the end of the continuous run is more than half the required interval, an additional joint shall be provided. Space joints evenly. Join extruded aluminum flashing stops and fascias by expansion and contraction joints spaced not more than 12 feet apart.

3.1.11 Counterflashing

Except where indicated or specified otherwise, insert counterflashing in reglets located from 9 to 10 inches above roof decks, extend down vertical surfaces over upturned vertical leg of base flashings not less than 3 inches. Fold the exposed edges of counterflashings 1/ 2 inch. Where stepped counterflashings are required, they may be installed in short lengths or may be of the preformed one-piece type. Provide end laps in counterflashings not less than 3 inches and make it weathertight with plastic cement. Do not make lengths of metal counterflashings exceed 10 feet. Form the flashings to the required shapes before installation. Factory- form the corners not less than 12 inches from the angle. Secure the flashings in the reglets with lead wedges and space not more than 18 inches apart; on short runs, place wedges closer together. Fill calked- type reglets or raked joints which receive counterflashing with calking compound. Calking is covered in Section 07920, "Joint Sealants." Turn up the concealed edge of counterflashings built into masonry or concrete walls not less than 1/ 4 inch and extend not less than 2 inches into the walls. Install counterflashing to provide a spring action against base flashing.

3.1.12 Fascias

Prefabricate in the shapes and sizes indicated and in lengths not less than 8 feet. Extend flange at least 4 inches onto roofing. Provide prefabricated, mitered corners internal and external corners

3.1.12.1 Edge Strip

Hook the lower edge of fascias at least 3/ 4 inch over a continuous strip of the same material bent outward at an angle not more than 45 degrees to form a drip. Nail hook strip to a wood nailer at 6 inches maximum on centers. Where fastening is made to concrete or masonry, use screws spaced 12 inches on centers driven in expansion shields set in the concrete or masonry. Where necessary, install strips over 1/16 inch thick compatible spacer or washers.

3.1.12.2 Joints

Leave open the section ends of flashing stops and fascias 1/ 4 inch and backed with a formed flashing plate, mechanically fastened in place and lapping each section end a minimum of 4 inches set laps in plastic cement. Face nailing will not be permitted. Install prefabricated aluminum fascias in accordance with the manufacturer's printed instructions and details.

3.1.13 Metal Drip Edge

Provide a metal drip, designed to allow water run- off to drip free of underlying construction, at overhangs. Extend back from the edge not more than 3 inches and secure with compatible nails spaced not more than 10 inches on center along upper edge.

3.1.14 Copings

Provide coping using zinc coated steel sheet with PVF2 coating finish 8 or 10 feet long joined by a ¾ inch locked and soldered seam. Terminate outer edges in edge strips. Install with sealed cover plate joints as indicated.

3.2 CLEANING

Clean exposed sheet metal work at completion of installation. Remove grease and oil films, handling marks, contamination from steel wool, fittings and drilling debris, and scrub- clean. Free the exposed metal surfaces of dents, creases, waves, scratch marks, and solder or weld marks.

3.3 REPAIRS TO FINISH

Scratches, abrasions, and minor surface defects of finish may be repaired in accordance with the manufacturer's printed instructions and as approved. Repair damaged surfaces caused by scratches, blemishes, and variations of color and surface texture. Replace items which cannot be repaired.

TABLE I. SHEET METAL WEIGHTS, THICKNESSES, AND GAGES

Sheet Metal Items	Aluminum Inch	Zinc Coated Steel, U.S. Std. Gage
Covering on minor flat, pitched or curved surfaces	.040	-
Scupper lining	.032	-
Strainers, wire diameter or gage	.144	-
Flashings:		
Cap (Counter- flashing)	.032	26
Overhang	-	24
Valley	.032	-
Fascias:		
Extrusions	.075	-
Sheets, corrugated	.032	-
Sheets, smooth	.050	24
Edge strip	.050	-
Joint Cover plates (See Table II)	.032	24

TABLE II. SHEET METAL JOINTS
TYPE OF JOINT

Item Designation	Steel, Zinc-Coated	Aluminum	Remarks
Flashings:			
Overhang flashing	One inch flat	One inch flat	Same as base
	Locked, cleated One inch loose locked, expansion joint cleated	locked, locked, cleated one inch loose locked, sealed expansion joints, cleated	
Edge strip	Butt	Butt	--
Sheet, smooth	Butt with 1/4 inch space	Butt with 1/4 inch space	Use sheet flashing back up plate

END OF SECTION